

(2) *On the Formation of a Double Embryo in the Hen's-egg.*

By PROFESSOR W. BALDWIN SPENCER, M.A.

Whilst working in the Biological Laboratory of the Melbourne University, one, amongst a large number of hens' eggs incubated, was found to present the curious feature of having two clearly-formed embryos developed within the limits of the one blastoderm. As this is by no means of common occurrence, and as the embryos were quite distinct, and developed to a considerable extent, it has been thought worth while to figure them (Pl. VI, fig. 2). Wolff, Reichert, Thompson, and others have previously shown that this may take place, and a figure showing two chick embryos distinct from one another, is given by the latter investigator.* In this case two embryos, of a very early stage, each showing what is probably meant for the primitive groove, are seen lying side by side, with their anterior ends close together. They are not sufficiently developed to show traces as yet of mesoblastic somites or nervous system. The anterior ends of the two are closely approximated, whilst the posterior ends diverge from one another. In the embryos figured by myself, the blastodermic area is somewhat elongated in the direction corresponding to that of the short axis of the egg; the area pellucida and the area opaca are clearly distinguishable from each other and the latter is covered with a complete network of blood-vessels, limited externally by the sinus terminalis. The two embryos are so placed that their anterior ends lie side by side in the middle of the area pellucida, whilst their posterior ends are directed towards the two opposite ends of the area. The two embryos are precisely similar to one another. Each has reached the stage at which the nervous system has the form of a tube, the anterior end of which is becoming swollen out to form the vesicles of the brain, though these are not as yet clearly differentiated. At the posterior end of the body the neural canal is still widely open, and encloses the remnant of the primitive streak and groove. The head-fold has lifted the

* I am indebted to Professor Allen, M.D., of the Melbourne University, for the opportunity of seeing this. It is to be found in "Todd's Cyclopædia of Anatomy and Physiology," under the article "Teratology."

head up above the blastoderm, but the latter is not yet enclosed by the amnion. In the middle region of the body seven pairs of mesoblastic somites are present.*

The vessels passing across the area pellucida to the embryos are not yet clearly visible, and the sinus terminalis is perfectly complete, no such structures as the one or two large vessels being present, which in the normal embryo return the blood to the body from the sinus at the anterior end.

Apparently, every stage may be met with between an embryo which shows reduplication of one portion of the body and the condition in which, as described above, two perfect embryos are formed within the area of the same blastoderm. One of these stages is represented in the adjoining drawing (Fig. 1), by Mr. Lucas, of an abnormal embryo, showing a clearly double formation at the head end and an indication also of doubleness at the posterior extremity, where the primitive streak divides into two halves, running out right and left of the median line. Occasionally an embryo is met with showing only this double nature of the primitive streak posteriorly.

Regarding simply the case in which the two embryos are complete and separate from one another, there are perhaps three ways in which it might possibly be supposed that the result has been brought about. First, as in the case of *Lumbricus trapezoides* division of the, at first single and normal, embryo may have taken place after a certain stage of development has been reached. It is difficult to imagine how this could have been produced; had it been so, the yolk and the area pellucida and opaca would have shown some trace of division. Secondly, it might be supposed that the two embryos were due to the existence of two distinct nuclei, enclosed abnormally within the protoplasmic material constituting one ovum. In contrast to the usual method of formation of the germinal cells in Craniata out of a number of nucleated cells, which first become aggregated

* For teaching purposes, I have found it convenient to relinquish the old form of nomenclature according to which chick embryos were designated by the number of hours of incubation—a most unsatisfactory method, since different eggs incubated for the same length of time will often yield embryos of various stages of development. I have instead adopted the method followed by Balfour in dealing with elasmobranch embryos, and according to which the stages of development are indicated by the letters of the alphabet. An account of these stages, with illustrative figures, is now in course of publication. The embryos here referred to are at the commencement of the stage which will be designated G.

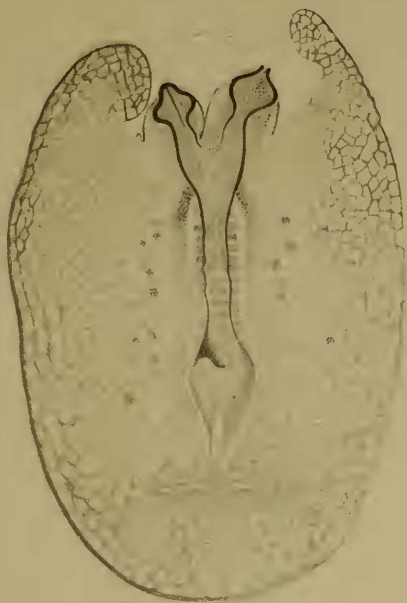


Fig. 1.

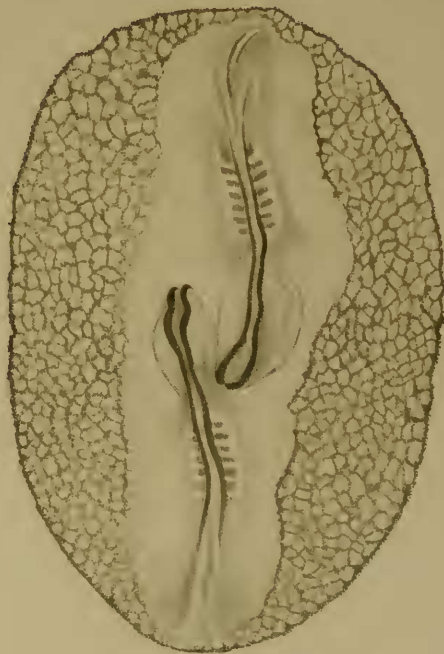


Fig. 2.